

Claim 26, line 2, change "outer" to --outermost--; and

line 3, change "outer" to --outermost--.

Claim 28, line 2, change "outer" to --outermost--.

Claim 29, line 2, change "outer" to --outermost--.

Claim 30, line 2, change "outer" to --outermost--.

Claim 31, line 2, change "outer" to --outermost--.

Claim 32, line 2, change "outer" to --outermost--.

Claim 36, line 6, change "outer" to --outermost--.

Claim 37, line 6, change "outer" to --outermost--.

#### REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 19-38 are pending, Claims 19-26, 28-32 and 36-37 having been amended by way of the present amendment.

In the outstanding Office Action the Declaration was indicated as being defective; Claims 19, 22-25, 31-33 and 35-38 were indicated as being unpatentable over Simmons et al (U.S. Patent No. 4,997,995) in view of Hvizd, Jr. et al (U.S. Patent No. 4,3561,723, hereinafter Hvizd); Claims 20 and 21 were rejected as being unpatentable over Simmons in view of Hvizd and in further view of Elton et al (U.S. Patent No. 5,066,881, hereinafter Elton); Claim 26 was rejected as being unpatentable over Simmons in view of Hvizd and in further view of Breitenbach et al (U.S. Patent No. 4,785,138, hereinafter Breitenbach) and Silver et al (U.S. Patent No. 4,384,944, hereinafter Silver); Claim 27 was rejected as being unpatentable over Simmons in view of Hvizd, Breitenbach, Silver and Cloetens et al (U.S.

Patent No. 4,859,810, hereinafter Cloetens); Claim 28 was rejected as being unpatentable over Simmons in view of Hvizd and in further view of Yamanouchi et al (U.S. Patent No. 4,894,284, hereinafter Yamanouchi); Claim 29 was rejected as being unpatentable over Simmons in view of Hvizd, Breitenbach, Silver and in further view of Yamanouchi; Claim 30 was rejected as being unpatentable over Simmons in view of Hvizd and in further view of Olsson et al (U.S. Patent No. 4,109,098, hereinafter Olsson); and Claim 34 was rejected as being unpatentable over Simmons in view of Hvizd and in further view of Breitenbach.

The undersigned appreciatively acknowledges the courtesy extended by the Examiner in meeting with the undersigned and Mr. Robert Hirt, a representative of the assignee, ABB, on December 15, 1999. During the interview the pending claims were discussed and contrasted with the asserted prior art, as discussed below.

In reply, Applicants filed herewith a Substitute Declaration as requested.

As discussed in the interview, a feature of the present invention is that a high-voltage winding is used that includes strands (12), surrounded by a first conductive layer (14), an insulating layer (16), and a second conductive layer (18), as shown in the figures. This winding made to be high-voltage winding for use in an electric machine. Conventional power cables are unsuitable for use as high-voltage windings since, among other things, they do not include an outermost layer that has a resistivity in a range or 10 through 500 ohm cm. Applicants identified that having a resistivity of the outermost conductive layer being in an inclusive range of 10 through 500 ohm\*cm it is possible to obtain sustained reliable use at high-voltages in an electric machine.

The inventors recognized that in order to use such a structure as a high-voltage winding in an electric machine, the insulation must not breakdown as a result of glow discharge. Therefore by selecting the outer conductive layer to be connected to a chosen

potential, for example earth, the entire length of the cable may be held at the earth potential. However if the resistivity is too great, the voltage on the second conductive layer mid-way between the grounded points (that is inside the stator) will be so high that there will be a risk of glow discharge. This glow discharge should be avoided since it will gradually degrade the insulation material and may lead to electric breakdown through the insulation. Thus, the present inventors identified that the resistivity of the second conductive layer is a design parameter that should be controlled so as to support high-voltage operations.

The present inventors also recognized that the resistivity cannot be too low in a high-voltage winding application because eddy current losses will become too high, thus giving rise to thermal stress and risk of shorting. This restriction between the low resistivity and high resistivity is explained mathematically at page 16, line 1, equation 2. Accordingly, the high end of the resistivity range is limited by a glow discharge threshold and the low end of the resistivity range is set by the maximum permissible eddy currents.

After having recognized that resistivity is a result-effective variable that enables the use of cables as high-voltage windings, the inventors performed a series of experiments that showed the resistivity of the second conductive layer should be between 10 and 15 ohm\*cm (see e.g., page 16, lines 4-6). This particular range is reflected in the pending claims. It is to be noted that Claim 38 is drafted with "means plus function" claim elements, that invoke an interpretation under 35 U.S.C. §112, sixth paragraph. Accordingly, the "means for setting a resistivity" corresponds with setting the resistivity in the range of 10 through 500 ohm\*cm, as is the case with the other claims.

As discussed in the interview, Simmons is directed to an "extra-high-voltage power cable" (see e.g., title). While the sole figure in Simmons describes a structure with a conductor, semiconductive screens, insulator and outer semiconductive screen, this figure

merely shows the "core" of the cable. As described at column 2, lines 19-26 the core includes each of the components included in the figure. However, the overall cable includes more than just a core, namely "conventional outer layers" around the core as explained at column 3, lines 7-10. Thus the overall cable described in Simmons is a conventional power cable, that does not have an outermost semiconductive layer, but rather a conventional outer layer which is typically a metal or other ungrounded material having a resistivity outside of the 10 to 500 ohm\*cm range. The criticality of the resistivity in an outermost layer for a conventional power cable is less important than for a winding since the power cable is not confined in a small location as would be the case with an electric machine, but is rather stretched out over many miles. Accordingly, Simmons need not be concerned about the thermal build up associated with cables that would have high eddy current losses, or arcing to adjacent structures. Thus it is respectfully submitted that Simmons does not disclose the claimed structure, which includes an outermost conductive layer that surrounds the insulating layer.

The outstanding Office Action asserts that, if only the core of the power cable in Simmons were used, the outer semiconducting layer would in all likelihood have a resistivity in the range of 1 to 1 million ohm\*cm, as is described in Hvizd (see e.g., column 2, lines 66-67) which overlaps the claimed range. The outstanding Office Action recognizes that Hvizd has a different structure than the insulated conductor presently claimed, although Hvizd is asserted for its teaching of a wide range of resistivity values for different semiconducting materials. More particularly, the basis of the rejection is that because Hvizd describes that a semiconducting material may range from 1 to 1 million ohm\*cm and that range overlaps with the claimed range of 10 to 500 ohm\*cm, then the outstanding Office Action has created a *prima facie* case of obviousness.

As explained in MPEP §2.144.05, Applicants can rebut a *prima facie* of obviousness based on overlapping ranges by showing the criticality of the claimed range. In the case of In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) when ranges overlap one another Applicants may overcome an obviousness rejection if the particular range is critical in showing that the claimed range achieves unexpectedly good results. In another case, In re Waymouth and Koury 182 USPQ, 290-294 (CCAP 1974) it was shown that the prior art taught a certain ratio of .0000001 to 1.3 as being an acceptable range of operation. However, the claimed invention showed that optimum results may occur between .08 to .75 (a copy of a figure showing this improvement is included as an attachment to this amendment).

As was previously discussed, the present inventors identified that the particular range of 10 to 500 ohm\*cm is a range that enables the use of this particular type of winding in a high voltage electric machine. If a resistivity is above that range, there is a risk of glow discharge, and if the resistivity is too far below that range it gives rise to unacceptable levels of eddy currents. Accordingly, it was the Applicants that identified that the resistivity was a result-effective variable that if restricted between 10 to 500 ohm\*cm, would provide an enabling structure for use as a high voltage winding in an electric machine.

The claimed range is very narrow with respect to the asserted range and there is nothing in the asserted prior art that would teach or suggest that this particular range would provide the optimum results that Applicants have identified.<sup>1</sup> Accordingly, for the reasons discussed above, it is respectfully submitted that in addition to the structural differences between the claimed invention and the asserted prior art (namely the "outermost" semiconducting layer), Applicants have also rebutted the *prima facie* case of obviousness, by explaining why the claimed range is critical for high-voltage winding applications in

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<sup>1</sup>The claimed range is .049% of the range described in Hvizd.

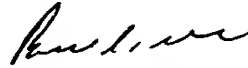
electrical machines and provides the unexpectedly good results, namely to provide an enabling high-voltage winding structure where others have been unsuccessful in providing the same.

As each of the independent claims have been rejected over these two references, and the claims have been amended to reflect the structural difference regarding the second semiconductor layer being an outermost layer, it is respectfully submitted that each of these claims is patentably distinguishing over the asserted prior art. Furthermore, it is described herein that the resistivity of the outermost layer is the result of Applicants having identified the resistivity as a result-effective variable that was not taught or suggested by the prior art. As discussed in the interview, because the primary reference of Simmons in view of Hvizd does not teach or suggest all the elements in the independent claims, it is respectfully submitted that features of the tertiary and quaternary references, are also absent in their teachings in regard to the above described features.

Consequently, in view of the present amendment and in light of the above remarks, it is respectfully submitted that the invention defined by Claims 19-38, as amended, is patentably distinguishing over the prior art. The application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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other claims, the board found it unnecessary to do so. Rather it made the holding, in which we find no reversible error, that:

Certain of the claims include additional features, such as specific reactants, mixing, low olefin concentrations, space velocity, specific illuminators, continuous operation, and temperature. Comparison of these features with the cited art indicates that they are either not novel or not unobvious departures from the teachings of the references. At the best, such variations as may be expressed are well within the expected skill of the technician of ordinary ability in this art.

[11] Two features mentioned in the above holding, "low olefin concentration" and "space velocity," appear in claim 77 as well as in some of the dependent claims. The examiner, as the solicitor noted, considered the disclosure in Garwood pertaining to the paraffin to olefin mole ratio "...higher molar ratios, e.g., about 12 to 1," to be suggestive of a ratio of 14 to 1, which amounts to about 7 mole percent. We consider that teaching adequate to negative unobviousness here, particularly since the recited percentage is not disclosed as or proved to be critical vis-à-vis the reference ratio. As to the recitation that the space velocity in the reaction mixture is in the range of 2-20 gram hydrocarbons per hour-gram catalyst, the examiner referred in his answer to Garwood's disclosure of space velocities "as high as 10," obviously depending on the disclosure of "about 1 to 10" quoted in our description of that reference. Despite considerable argument in their briefs about space velocity, appellants do not deny that this disclosure of Garwood falls within their recited range.

Accordingly, the board's treatment of the rejection of claims 51-56, 58, 60-63, 65-69, 75 and 77 under 35 U.S.C. 103 is free of reversible error and will be sustained.

[12] Therefore, the rejection of claim 86 alone under 35 U.S.C. 112 requires our consideration although the rejection also applied to some of the other appealed claims. The basis of that rejection is that the recitation therein (reading like item (ii) of claim 77) requiring the amount of unreacted olefin in the reaction mixture be maintained at less than 7 mole percent based on the unreacted isobutane, is vague and indefinite.<sup>6</sup> The rejection is based on the view that the language of the recitation sets only a maximum amount of olefin

<sup>6</sup> Since we reverse this rejection on the merits we see no occasion to consider appellants' argument that the board improperly considered the examiner to have included this and certain other claims with still other claims, which the examiner specifically rejected on the same grounds. Also, we have given no consideration to the matter discussed in note 2, supra.

and hence "is inclusive of substantially no olefin, resulting in the termination of any reaction." We see no merit in this rejection. The claim requires a process for the preparation of olefin-paraffin alkylate by contacting the two reactants under defined conditions. The imposition of a maximum limit on the quantity of one of the reactants without specifying the overall amount does not warrant distorting the meaning of the claim, to preclude performing the claimed process. The rejection of claim 86 will not be sustained.

The decision is affirmed as to claims 51-56, 58, 60-63, 65-69, 75 and 77 and reversed as to claim 86.

## Court of Customs and Patent Appeals

In re WAYMOUTH AND KOURY

No. 9191 Decided June 27, 1974

### PATENTS

#### 1. Patentability — Invention — In general (§51.501)

Claimed ratio was not result of obvious experimentation since experimentation would not have come from within teachings of the art; in determining whether experimentation is within teachings of art, court must read obviousness into an invention on basis of applicants' own statements, i.e., court must view prior art without reading applicants' teachings into it.

#### 2. Construction of specification and claims — In general (§22.01)

##### Operability (§48.)

Fact that specification does not describe ratio as merely preferred, but rather in terms stating that ratio "must be obtained," shows that ratio is critical; court finds no support for proposition which would require inoperativeness of a device when operating over a different range from that claimed, in order to support finding of criticality for claimed range.

##### 3. Operability (§48.)

#### Patentability — Change — In general (§51.251)

Although reference's range of possible ratios envelopes range claimed by applicants,

BALDWIN, Judge.

applicants' claims are allowed since unexpected results flow from applicants' critical, narrower range; in order for applicants to show an unexpected result, their lamp need not be imperceptible over other ranges, but rather that over claimed critical range there be a difference in kind, rather than in degree.

### Particular patents—Lamp

Waymouth and Koury, Mercury Lamp, claims 1 to 13 of application allowed.

Appeal from Board of Appeals of the Patent Office.

Application for patent of John F. Waymouth and Frederic Koury, Serial No. 810,490, filed Mar. 26, 1969; Patent Office Group 251. From decision rejecting claims 1 to 13, applicants appeal. Reversed: Miller, Judge, dissenting with opinion.

JAMES THEODOSIOPOULOS, Ipswich, Mass., for appellants.

S. WM. COCHRAN (FRED W. SHERLING, of counsel) for Commissioner of Patents.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE, and MILLER, Associate Judges.

This is an appeal from the decision of the Patent Office Board of Appeals sustaining the rejection of claims 1-13 of appellants' application.

### The Invention

The invention relates to high pressure electric discharge devices, or lamps, which are commonly used for highway and outdoor area lighting. The lamp includes an arc tube which contains halogen and mercury atoms present in a specified ratio - 0.08 to 0.75.

Conventional high pressure electric discharge devices characteristically emit a bluish white light which does not illuminate as well as light which does of poor color rendition. When these conventional lamps are used to illuminate a red object, the object appears black, not red. Appellants have sought to achieve white light emission from their lamps and have discovered that maximum white light emission can be achieved when the claimed ratio of halogen atoms to mercury atoms is maintained. Appellants' application contains the following graph which illustrates the effect produced upon white light emission plotted against the halogen atom to mercury atom ratio.

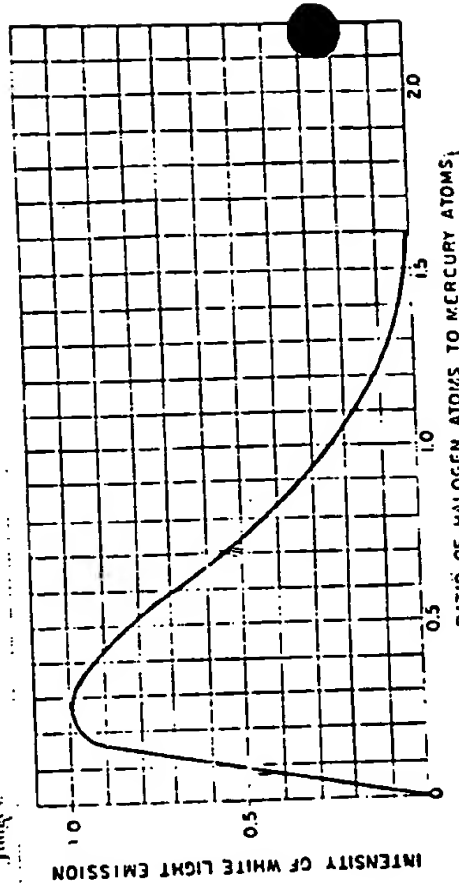


FIG. 2

Claims 1 and 10 are representative of the appealed claims:

1. In a high pressure electric discharge device having an arc tube with electrodes sealed at each end thereof and having means to convey electrical energy to each of said electrodes and having atoms of mercury, atoms of a halogen selected from the group consisting of iodine, bromine and chlorine and atoms of a metal capable of reacting

with halogen, the improvement which comprises: said halogen and mercury being contained in said arc tube in a ratio of halogen atoms to mercury atoms between about 0.08 to 0.75, the visible emission of said arc tube when an arc is formed therein being a substantially complete forest of spectral lines in

<sup>1</sup> Serial No. 810,490, filed March 26, 1969.